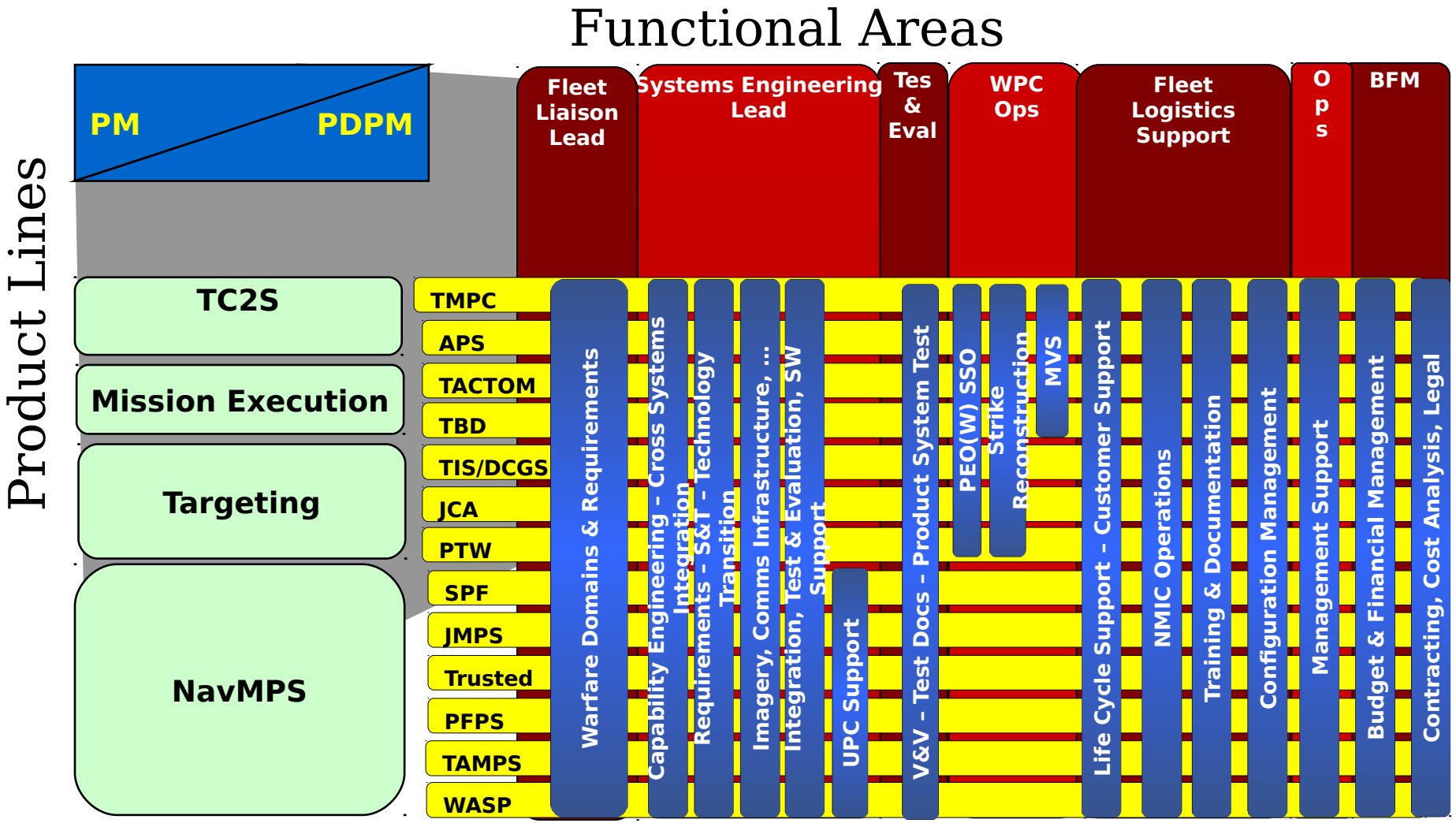
WATRB

Naval Mission Planning, Targeting, and Tomahawk Command & Control Program

Larry Tingler
PMA281-31
5 May 2004

PMA281 Organization in transition



Tomahawk Command & Control Systems

Theater Mission Planning Center (TMPC)

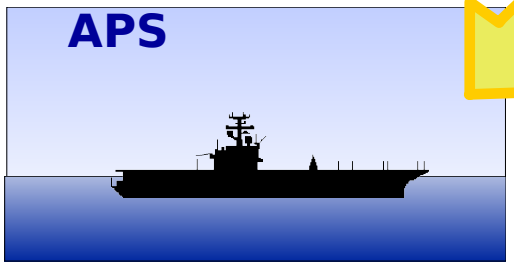
Precision Targeting Workstation
- -Imagery Screening
- -Target measurement

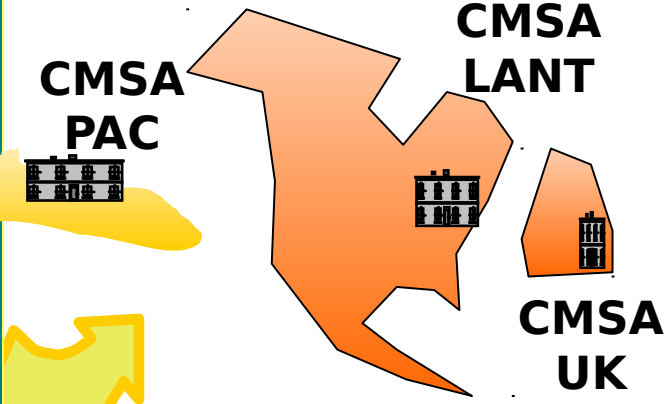
Mission Distribution System
- Quality Check
- MDU Transmission
- Strike Management

Digital Imagery Workstation Suite
- Target Measurement
- DSMAC Map Production
- Vertical Update Points

Tomahawk Planning System
- -Route planning
- Auto router
- interactive
- -Performance Prediction
  - -NAV analysis
  - -Threat Analysis

TCOMMS
- Provides Comprehensive Communications Interface Support for TC2S Installations
- Network Protection
- TCI Distribution Management





Afloat Planning System (APS)

PTW

MDS

DIWS Afloat (DIWSA)

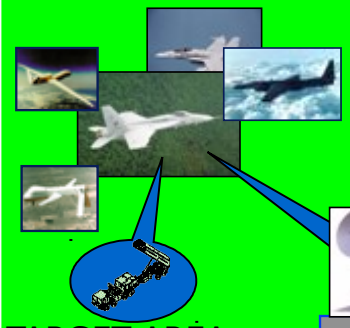
TPS

Battle Group Mission Review

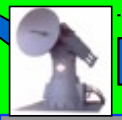
Afloat Targeting Architecture
Enabling Time Sensitive, Effects-Based Operations

Tactical Input Segment
Primary Tactical Imagery
Common Imagery Processor
Fielded, awaiting OT

JSIPS-N Concentrator
Primary National Imagery
Secondary Tactical Imagery
Fielded



TARGET AREA



CDL-N

Image Product Library
Fielded to All JSIPS-N Sites
Imagery & Targeting Products

DETECT / ASSESS

DETECT / DIRECT

ENGAGE

Weapon Delivery:
- ***TLAM***
- ***JDAM***
- ***JSOW***
- ***SLAM-ER***
- *TACTOM*
- *JASSM*
- *ERGM*
- *AGS*
- *LASM*
- *ALAM*

Pre-flight

In - Flight

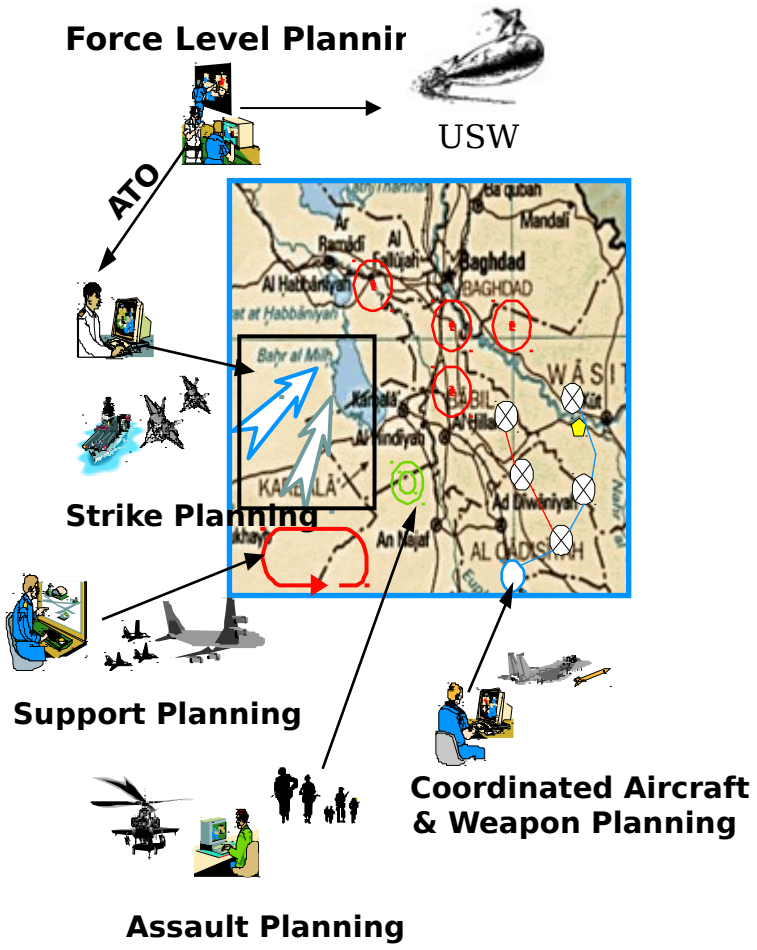
Afloat Planning Systems:
- **TPS / MDS**
- **Strike Planning Folder**
- ***TAMPS*** */ JMPS*
- *NFCS / TLN*

PTW 4.1/4.1.1
National & Tactical Sensors
Rapid Aimpoint Generation
Fielded

Technology Thrusts
TC2S

- Mission Planning Timeline
  - Auto-Router Improvements
  - Improved system Architecture
    - Migration to PC environment
    - TC2S sub-systems become applications on the desk top
    - Shared common data store
    - Enterprise based planning with collaboration
- Tomahawk Strike Network
  - Improvements in throughput & reliability
- Maintaining Tomahawk Targeting & Navigation Product support without DCGS-N
  - DCGS-N transitioning to a new program office
  - Automated, all source aim-point extraction, target shape, navigation aides
- Integration of Tomahawk Mission Planning with Joint Mission Planning System (JMPS) and support coordinated strike operations
  - Support joint collaboration / deconfliction
  - Reduces overall life cycle support costs

JMPS Overview
(Mission and Objectives)



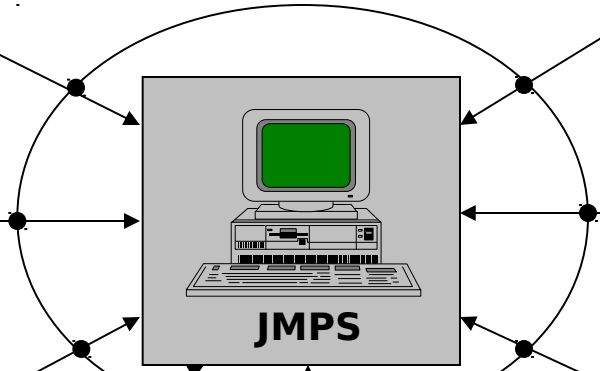
Mission Statement

- Evolve world-class joint mission planning capabilities to support the warfighter capability today and fulfill Joint Vision 2020

Objectives

- PC-based and scaleable
- Stable open-architecture
- Interoperability through Extensive Multi-Service Commonality and COE/JTA compliance
- Reduce life-cycle costs
- Capability ≥ legacy systems

JMPS-M System View
(Overview)



Intelligence Interfaces
- SIPRNET
- SPF
- GCCS-M
- NRT Broadcasts
- JSIPS-N
- QUIVER

DETAILS

Navigation Interfaces
- TBMCS
- NavSSI
- Other MPS
- NIMA
- GPS
- Aircraft
- Manual Entry

DETAILS

Collaboration Interfaces
- Other MPS
- GCCS-M
- SPF

DETAILS

Environmental Interfaces
- METCAST
- OPARS
- SIPRNET
- Manual Entry

DETAILS

Targeteering Support Interfaces
- JSIPS-N
- GCCS-M
- SPF
- SIPRNET
- GBS

DETAILS

GI&S Interface
- SIPRNET

DETAILS

C2/Operations Interfaces
- GCCS-M
- SHARP
- ADMACS
- Manual Entry
- NALCOMIS
- TBMCS

DETAILS

Information Security Interfaces
- Crypto Fill Device
- Manual Entry
- SIPRNET
- Aircraft

DETAILS

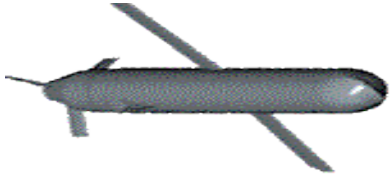
Phase One
Phase Two
Phase Three

Technology Thrusts
JMPS

- Network Centric
  - Support GIG concepts / technologies
  - Collaboration capabilities
  - Robust Network Infrastructures
    - Fast, reliable, re-configurable
- Mission Rehearsal
- Software Architectures
  - Enterprise Based
  - XML
  - Multi-Level Security
  - Cross network data commonality

Back-Ups

TC2S Incremental Upgrades



TLAM BLK III

3.4

PCTPS

Multi-Level Security

PTW Accelerated Client

IOC Apr 2004

TLAM BLK IV

4.0

TACTOM Capable

TLAM Planning

Strike Management

IOC May 2004

TLAM BLK IV

4.1

TTL

SSGN

SCT

Strike Mgmt Improvements

IOC Sep 2005

TLAM BLK IV

4.2

MGMT tools Imagery Apps

NGA product update

High rez terrain

Architecture Improvements*

ITA

IOC Sep 2006

TLAM BLK IV

5.0

Common Use Data

TTPV*

PTAN*

Objective Architecture*

IOC July 2008

*** Unfunded**

TC2S Objective Roadmap

TC2S 4.1 – IOC '05

- CUD-Standard DED
  - MIDB
  - DAL
- TOST (Initial)
  - MPR / TMPR
  - Task Status
- Threat Database
- Small Cell TERCOM
- Initial ITA capabilities

TC2S 4.2 – IOC '06

- Mission planning management tools
- Automated DEM
- VOD from NGA
- DIWS Recast
  - Re-allocation of Image-Based product Reqts:
- Integrated Training Architecture

TC2S 5.0 – IOC '07/'08

- Common Use Database (full)
  - Data manager
  - Data storage infrastructure
- Strategic Hardware
  - Performance
- TTPV/PTAN
  - Unfunded

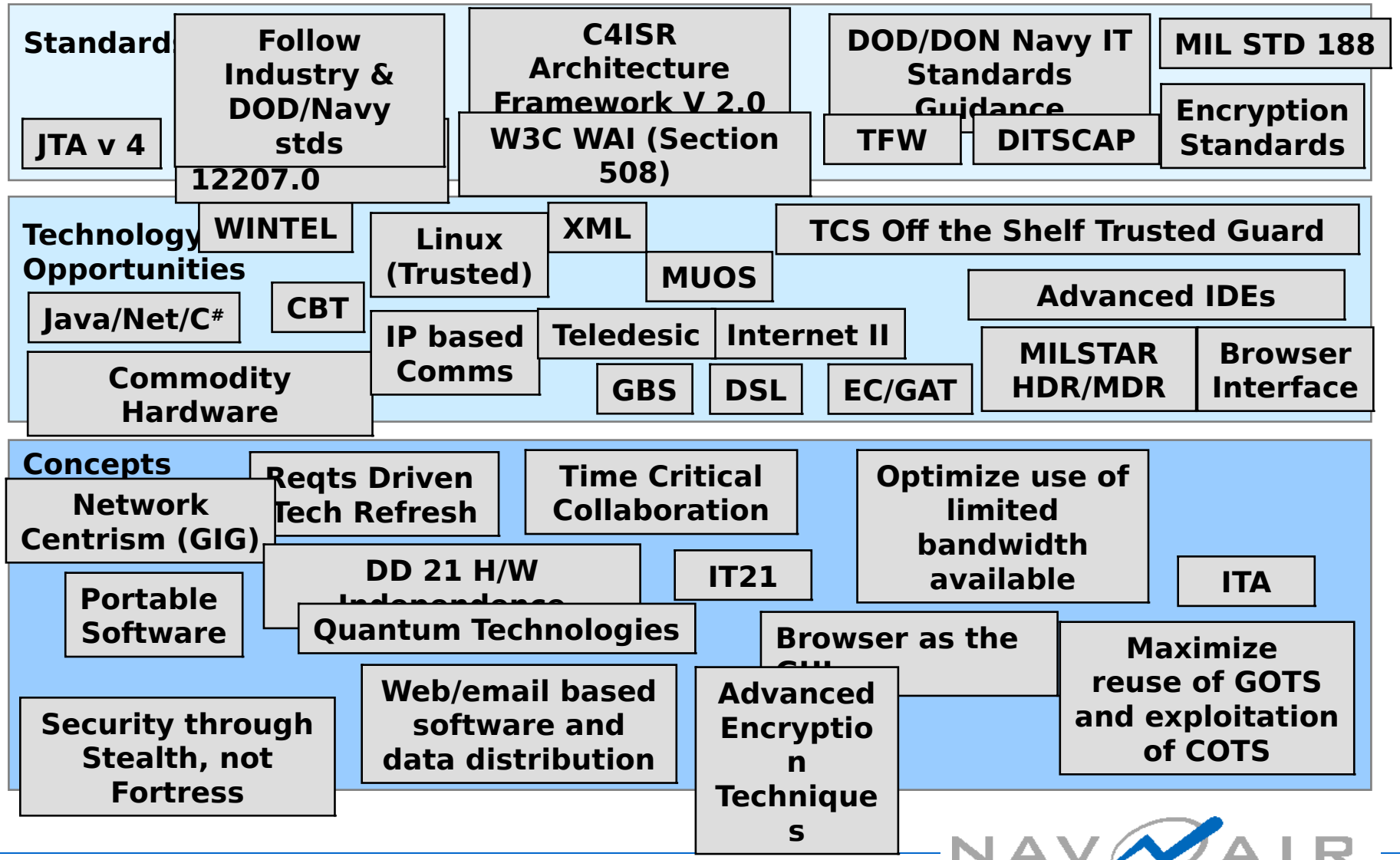
Data Normalization

Automation and Mission Management

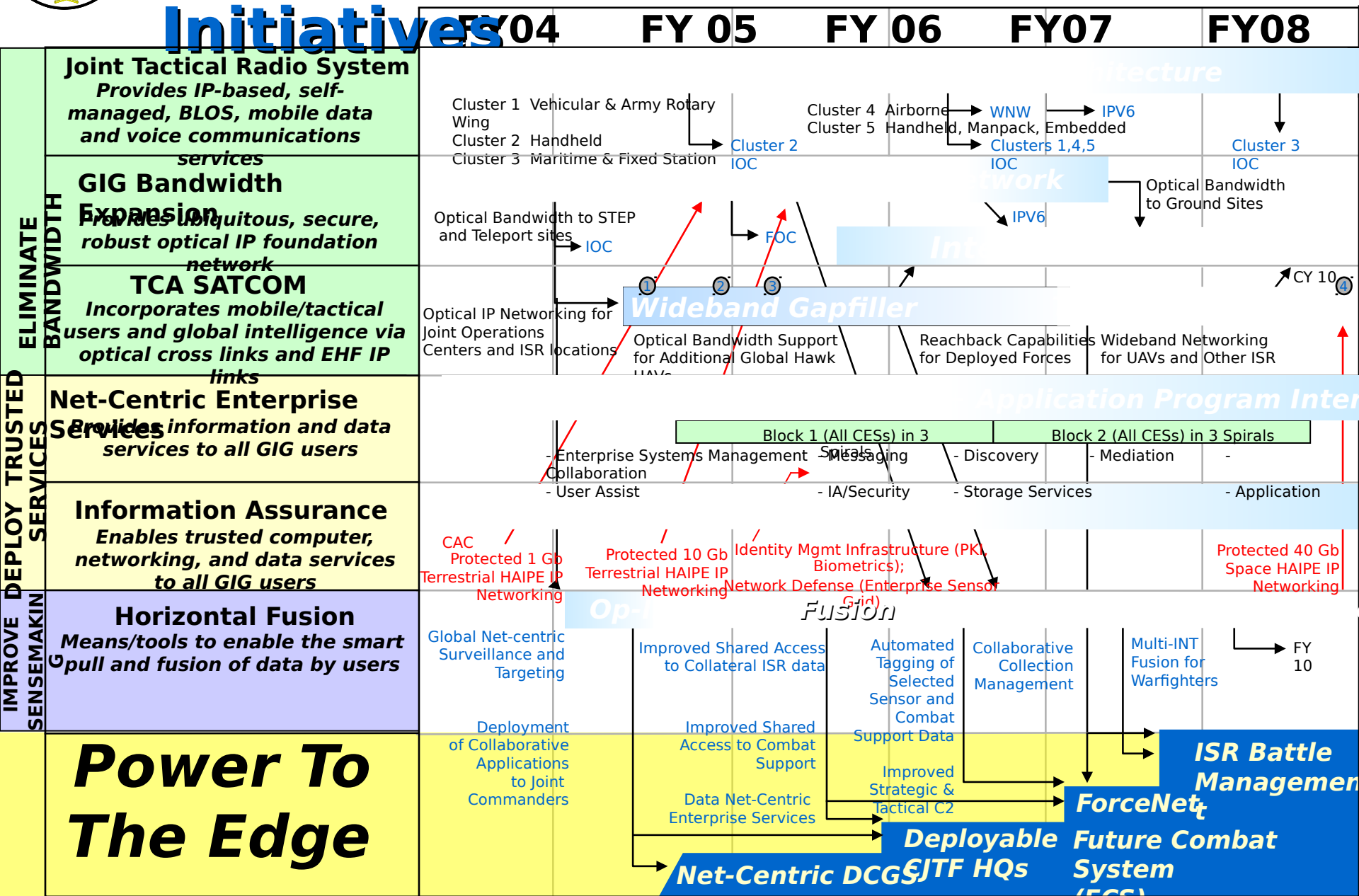
Performance and Objective Architecture

Roadmap Focus Areas

NAVMPS
Technology Concepts



A Roadmap of Key Net-Centric Initiatives


FY04
FY 05
FY 06
FY07
FY08
ELIMINATE BANDWIDTH
DEPLOY TRUSTED SERVICES
IMPROVE SENSEMAKING
Joint Tactical Radio System
Provides IP-based, self-managed, BLOS, mobile data and voice communications services
GIG Bandwidth Expansion
Provides ubiquitous, secure, robust optical IP foundation network
TCA SATCOM
Incorporates mobile/tactical users and global intelligence via optical cross links and EHF IP links
Net-Centric Enterprise Services
Provides information and data services to all GIG users
Information Assurance
Enables trusted computer, networking, and data services to all GIG users
Horizontal Fusion
Means/tools to enable the smart pull and fusion of data by users
Power To The Edge
Cluster 1 Vehicular & Army Rotary Wing
Cluster 2 Handheld
Cluster 3 Maritime & Fixed Station
Cluster 2 IOC
Cluster 4 Airborne
Cluster 5 Handheld, Manpack, Embedded
WNW
IPV6
Clusters 1,4,5 IOC
Cluster 3 IOC
Optical Bandwidth to Ground Sites
IPV6
Optical Bandwidth to STEP and Teleport sites
IOC
FOC
CY 10
Wideband Gapfiller
Optical IP Networking for Joint Operations Centers and ISR locations
Optical Bandwidth Support for Additional Global Hawk UAVs
Reachback Capabilities for Deployed Forces
Wideband Networking for UAVs and Other ISR
Block 1 (All CESs) in 3 Spirals
Block 2 (All CESs) in 3 Spirals
- Enterprise Systems Management
- Collaboration
- User Assist
- Messaging
- IA/Security
- Discovery
- Storage Services
- Mediation
- Application
CAC
Protected 1 Gb Terrestrial HAIPE IP Networking
Protected 10 Gb Terrestrial HAIPE IP Networking
Identity Mgmt Infrastructure (PKI, Biometrics); Network Defense (Enterprise Sensor Grid)
Protected 40 Gb Space HAIPE IP Networking
Fusion
Global Net-centric Surveillance and Targeting
Improved Shared Access to Collateral ISR data
Automated Tagging of Selected Sensor and Combat Support Data
Collaborative Collection Management
Multi-INT Fusion for Warfighters
FY 10
Deployment of Collaborative Applications to Joint Commanders
Improved Shared Access to Combat Support
Improved Strategic & Tactical C2
Data Net-Centric Enterprise Services
ISR Battle Management
ForceNet
Deployable JTF HQs
Future Combat System (FCS)
Net-Centric DCGS

PMA281
Technology Needs

Improved Targeting

- Applications that quickly provide precision quality targeting information form any and all sources.
- Technologies that provide, or enable, collaborative targeting between multiple users at one or multiple sites; and using multiple sources of information.
- Advanced Automated Target Detection/Recognition/Classification techniques utilizing data, separately or together, from all types of ISR sensors; e.g., EO//IR/SAR/MASINT. These techniques must be able to work in a Camouflage, Concealment, and Deception (CCD) environment; and importantly be able to quickly train to detect new and different targets than traditional Soviet or Russian equipment.
- Onboard processing and compression if ISR sensor data to reduce TACRECCE ground station complexity and size. As an example, placing an airborne ATR on the ISR platform leads to better TACRECCE bandwidth utilization.
- An Intelligent Automated Targeting Assistant that accepts queries, imagery, threat data, and other required products based on INT and multi-INT reports to improve intelligence processing workflow management, visualization and fusion.
- Technologies that provide automated image and video registration quickly and accurately.
- Technologies that provide integrated/interactive multi-INT fusion and display; and that improve analyst screening capability.
- Practical advanced lossless imagery compression schemas.
- Sensor to sensor correlation for targeting (SAR to EO, IR to EO, etc.).
- Advanced ELT image “tiling” and “on-the-fly” decompression technologies.
- Web-centric applications for precision imagery exploitation, geo-positioning,

PMA281
Technology Needs

Improved Navigation

- Technologies, algorithms, and proposals to provide precise autonomous weapon navigation capability based on Digital Elevation Data (DEM), imagery, or fused sources of both and/or other 3rd party sensor information.

Improved Terminal Area Planning

- Technologies that provide the capability to automatically extract 3-d target aim points.
- Technologies that provide an automatic, timely, and reliable aim point verification capability for both planners and operators.
- Technologies that provide automated terminal sensor data extraction and development.
- Improved sensor model algorithms for COTS ELT packages to support TCS precision and timeliness requirements.
- ATR algorithms for both fixed and mobile targets in a Camouflage, Concealment, and Deception CCD environment.
- Algorithms and technologies that provide rapid ATR template generation
- Automated mission support data extraction and development; for example, automatic extraction of vertical obstructions along the planned terminal trajectory of a weapon; extraction, development, and validation of vertical update patches; etc.

PMA281
Technology Needs

Improved Mission and Strike Planning

- Improved automated route/mission planning deconfliction techniques and algorithms.
- An Intelligent Automated Route Planning Assistant – when ATO arrives assistant "reads" targets and orders imagery, threat updates, and other required products. Forwards notification to targeting and mission planning systems to initiate planning.
- Improved technologies and/or procedures for Tactical Control Station integration aboard carriers and large deck amphibs
- Technologies to integrate weapons planning with onboard (ship) inventory and ordering program
- Automated Munitions Effectiveness/Battle Damage Assessment techniques and technologies.
- Technologies that provide multi-database battlefield visualization based on need of the user and their bandwidth capabilities; and that reduces information clutter to improve decision making.
- Technologies that provide improved weapon, mission, and strike performance prediction.
- An Intelligent Automated Threat Data Base Agent that provides autonomous, rapid, and timely creation of weapon specific threat data bases.

PMA281
Technology Needs

Connectivity, Security, Tools, Odds and Ends

- C2 connectivity between imagery sources, planning agencies and weapons.
- Multi-level security
- More Windows commonality with all system GUIs
- Clearly articulated requirements for support of Time Critical Strike (TCS)
- Modular payloads for Tomahawk